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Date: October 30, 2000

Docket No.: 2950-0175P

Assistant Commissioner for Patents  
Box PATENT APPLICATION  
Washington, D.C. 20231

Sir:

Transmitted herewith for filing is the patent application of

Inventor(s): KIM, Byung Jin  
SEO, Kang Soo; YOO, Jea Yong

For: METHOD FOR SUPPORTING A STILL PICTURE OF DATA STREAM  
RECORDED IN A DISK RECORDING MEDIUM

Enclosed are:

- ☒ A specification consisting of 13 pages
- ☒ 04 sheet(s) of Formal drawings
- ☒ An assignment of the invention
- ☒ Certified copy of Priority Document(s)
- ☒ Executed Declaration ☐ Original ☒ Photocopy
- ☐ A verified statement to establish small entity status under 37 CFR 1.9 and 37 CFR 1.27
- ☐ Preliminary Amendment
- ☐ Information Disclosure Statement, PTO-1449 and reference(s)

Other \_\_\_\_\_

The filing fee has been calculated as shown below:

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## SMALL ENTITY

FOR	NO. FILED	NO. EXTRA	RATE	FEE		RATE	FEE
BASIC FEE	***** ***** *****	***** ***** *****	***** ***** *****	\$710.00	or	**** **** ****	\$355.00
TOTAL CLAIMS	14 - 20 =	0	x18 =\$	0.00	or	x 9 = \$	0.00
INDEPENDENT	5 - 3 =	2	x80 =\$	160.00	or	x 40 = \$	0.00
MULTIPLE DEPENDENT CLAIM PRESENTED <u>no</u>			+270 = \$	0.00	or	+135 = \$	0.00
				TOTAL \$	870.00	TOTAL \$	0.00

X A check in the amount of \$ 910.00 to cover the filing fee and recording fee (if applicable) is enclosed.

\_\_\_\_ Please charge Deposit Account No. 02-2448 in the amount of \$ \_\_\_\_\_. A triplicate copy of this transmittal form is enclosed.

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If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. 1.16 or under 37 C.F.R. 1.17; particularly, extension of time fees.

Respectfully submitted,

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[illegible]

Year	Population	Area	Population	Area
1990	1,000,000	100,000	1,000,000	100,000
1995	1,200,000	120,000	1,200,000	120,000
2000	1,400,000	140,000	1,400,000	140,000
2005	1,600,000	160,000	1,600,000	160,000
2010	1,800,000	180,000	1,800,000	180,000
2015	2,000,000	200,000	2,000,000	200,000
2020	2,200,000	220,000	2,200,000	220,000
2025	2,400,000	240,000	2,400,000	240,000
2030	2,600,000	260,000	2,600,000	260,000
2035	2,800,000	280,000	2,800,000	280,000
2040	3,000,000	300,000	3,000,000	300,000
2045	3,200,000	320,000	3,200,000	320,000
2050	3,400,000	340,000	3,400,000	340,000
2055	3,600,000	360,000	3,600,000	360,000
2060	3,800,000	380,000	3,800,000	380,000
2065	4,000,000	400,000	4,000,000	400,000
2070	4,200,000	420,000	4,200,000	420,000
2075	4,400,000	440,000	4,400,000	440,000
2080	4,600,000	460,000	4,600,000	460,000
2085	4,800,000	480,000	4,800,000	480,000
2090	5,000,000	500,000	5,000,000	500,000
2095	5,200,000	520,000	5,200,000	520,000
2100	5,400,000	540,000	5,400,000	540,000

100

When a HDVD player is connected with a digital television to playback a HD-DVD, it should have specific video pictures to be displayed as still images on a screen of a digital television. Examples of the specific video pictures are a background image of menu bars for selection of various functions provided from a HD-DVD, and a menu screen for editing a content scenario of a moving picture program recorded in a HD-DVD.

To embody still picture of data stream recorded in a DVD-ROM which is being popularized more and more, a still mark is written behind a data stream section corresponding to a still picture, and a DVD-ROM player, which can reproduce a DVD-ROM disk, repeats to output the last-decoded stream section if a still mark is detected while reproducing recorded programs.

This method is possible since a DVD-ROM player has been developed in expectation that it is to be connected with an analog television not equipped with a MPEG decoder so that it has a MPEG decoder as an internal component, therefore, a DVD-ROM player can detect still marks contained in data stream while decoding data stream recorded in a DVD-ROM disk.

However, a HDVD-player may not have a MPEG decoder as an internal component since it is under development on assumption that it may be connected a digital television equipped with a MPEG decoder through a digital interface such as IEEE 1394 as aforementioned.

Therefore, even though still marks are inserted in every data stream section corresponding to still picture in a HD-DVD as in a DVD-ROM, a HDVD player can not conduct still operation if it has not a decoder, that is, it can not detect the still mark.

In addition, a digital television developed at present can not support still function for data stream when it receives data stream from a HDVD player connected through a digital

interface, so that it is urgently required to develop a method of presenting a specific data stream section from a disk device such as a HDVD player in a still picture at a digital television.

#### SUMMARY OF THE INVENTION

5 It is an object of the present invention to provide a method of recording still information, which is identifiable at a digital television, in a high-density disk, and a method for enabling a digital television to present a part of digital stream corresponding to a still picture received through a  
10 digital interface such as IEEE 1394 as a still picture based on the furnished still information or data stream.

A still picture supporting method according to the present invention, when recording video data in an optical disk, writes still information indicating that a video data stream  
15 section is to be presented as a still picture, and writes information in a cell on whether there is a still picture in a stream object containing the video data stream section wherein the cell is linked with the stream object.

Another still picture supporting method according to the  
20 present invention, when recording video data in an optical disk, records video data in a streaming format, and writes a transport packet indicating that a data section among the recorded video data is a still picture at a neighboring side of the data section, wherein the contents of the transport packet is not decoded when  
25 reproducing the recorded video data.

Another still picture supporting method according to the present invention, when reproducing data stream recorded in an optical disk comprising recorded video data stream; still information indicating that a video data stream section among  
30 the recorded video data stream is to be presented as a still picture; and information written in a cell on whether there is a still picture in a stream object containing the video data

stream section wherein the cell is linked with the stream object,  
checks whether a video data reproduced from the disk is  
corresponding to a still picture, and conducts an iteration of  
transmitting a predictive picture data of the reproduced video  
5 data repeatedly after transmitting the reproduced video data  
based on the checked result.

#### BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are included to provide  
a further understanding of the invention, illustrate the  
10 preferred embodiments of the invention, and together with the  
description, serve to explain the principles of the present  
invention.

In the drawings:

FIG. 1 shows a digital television and a HDVD player to  
15 which a method for supporting a still picture of data stream  
recorded in a disk according to the present invention is  
applied;

FIG. 2 shows a format example of a recorded stream to  
embody a still picture supporting method according to the  
20 present invention;

FIG. 3A shows a format example of a recorded stream to  
embody another still picture supporting method according to the  
present invention;

FIG. 3B shows an information example written in a cell  
25 associated with a stream object containing a still picture  
data; and

FIG. 4 shows a transmission example of a recorded stream  
corresponding to a still picture according to another  
embodiment of the present invention.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

In order that the invention may be fully understood, preferred embodiments thereof will now be described with reference to the accompanying drawings.

5        FIG. 1 shows a digital television 200 and a HDVD player 100 to which a method for supporting a still picture of data stream recorded in a disk according to the present invention is applied. The digital television 200 and the HDVD player 100 are connected each other through a IEEE 1394 digital interface.

10        The data written in a HD-DVD which is to be played back in the HDVD player 100 is grouped into high-density stream objects (called 'HOBs' hereinafter). A HOB may correspond to a single program or a digital stream recorded from recording start to stop, and it is to be associated with each cell which  
15 is used for determining the playback sequence of moving picture contents recorded in a HD-DVD.

FIG. 2 shows a format example of a recorded stream to embody a still picture supporting method according to the present invention.

20        As shown in FIG. 2, the data stream belonging to a certain HOB contains a still packet as still information. The function of a still packet is to command the digital television 200 to repeat to decode a stream constituting a single picture following the still packet instead of advancing the  
25 reproduction, and a still packet contains still duration information indicating how long the requested still operation lasts. The still duration is classified into two types of the definite and the indefinite. The definite type may have time value ranging from 1 to 254 seconds, and the indefinite type  
30 is used in a condition that a key command from a user is necessary.

When the data stream recorded as in FIG. 2 is reproduced in the HDVD player 100 and is transmitted to the digital





The still packet may not contain information on still duration. Instead, the HDVD player 100 resumes data reproduction from recorded data following the still packet and transmits the reproduced data stream to the digital television 100 if a user requests release of still status. According to the resumption of data reproduction, the digital television 200 receives data packets next to the still packet, then it acknowledges the reception of data packet as release of still picture, and decodes the received data packets as soon as it stops repetition of decoding of one picture.

FIG. 3A shows another format example of a recorded stream to embody a still picture supporting method according to the present invention.

As explained above referring to FIG. 2, the data written in a HD-DVD which is to be played back in the HDVD player 100 is grouped into HOBs. A HOB is also corresponding to a single program or a digital stream recorded from recording start to stop, and it is related with each cell which is used for determining the playback sequence of moving picture contents recorded in a HD-DVD.

And, a HOB is composed of high-density stream object units (referred 'HOBUs' hereinafter), and a data stream constituting a HOB is recorded across a lot of data packs as shown in FIG. 3A. A data pack is a data accessing unit whose size is physically readable and/or writable at a time, that is, it is corresponding to a sector of a DVD-ROM. Each data pack consists of a pack header and several transport packets written in it.

The pack header comprises fields of 'STILL Indicator', 'SYS\_PCR\_base', 'SYS\_PCR\_ext', and 'Reserved'. A transport packet may contain a program clock reference (PCR) which consists of a 9-bit extension value and a 33-bit base value according to the MPEG standard. The extension value is a



pictures (GOP), and real video data, and the P-picture data is composed of a header and predictive real data.

The transmission ratio of I-picture to P-picture is 1:15. That is, a I-picture is transmitted once every 15 transmission of P-picture. When transmitting the I-picture repeatedly, the HDVD player 100 generates a PCR whose value is transporting time of each transport packet constituting the I-picture, and inserts it into every packets or every a few packets. When transmitting P-pictures repeatedly, the HDVD player 100 transmits P-picture header only without transmitting predictive real data.

The information of transmitting repetition duration, i.e., still duration may be written in a cell or a pack header. If this information has been written, the HDVD player 100 resumes next reproduction after stopping the transmitting repetition when the still duration expires, if has not, it resumes next reproduction when a user requests to do that.

In this embodiment of still picture supporting method, the digital television 200 needs not conduct an additional operation for still mode, instead, it just conducts a normal operation to decode the received data stream section provided repeatedly from the HDVD player 100.

The still picture supporting method according to the present invention makes it possible to present a background image of menu bars for selection of various functions provided from a HD-DVD and a menu screen for editing a content scenario of a moving picture program recorded in a HD-DVD as a still picture on a digital television on condition that a HDVD player is delivering real data in the format of data stream to a digital television connected through a digital interface such as IEEE 1394.

The invention may be embodied in other specific forms without departing from the sprit or essential characteristics

thereof. The present embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

**What is claimed is:**

1. A method of writing information for supporting still picture of data stream recorded in an optical disk, comprising the steps of:

(a) writing still information indicating that a video data stream section is to be presented in a still picture; and

(b) writing information in a cell on whether there is a still picture in a stream object containing the video data stream section, the cell being linked with the stream object.

2. The method set forth in claim 1, wherein said step (b) further writes information indicating the location of the video data stream section in the cell.

3. The method set forth in claim 1, wherein said step (a) writes the still information in a header of a sector in which the video data stream section is written.

4. The method set forth in claim 1, wherein the video data stream section to be presented as a still picture consists of Infra-coded picture data and predictive picture data.

5. A disk device comprising recorded video data stream, still information indicating that a video data stream section among the recorded video data stream is to be presented as a still picture, and information written in a cell on whether there is a still picture in a stream object containing the video data stream section wherein the cell is linked with the stream object.

6. The disk device set forth in claim 5, further comprising information indicating the location of the video

data stream section, the location information being written in the cell.

7. The disk device set forth in claim 5, wherein the still information is written in a header of a sector in which the video data stream section is written.

8. A method of writing information for supporting still picture of data stream recorded in an optical disk, comprising the steps of:

(a) recording video data in a streaming format; and

(b) writing a transport packet indicating that a data section among the recorded video data is a still picture at a neighboring side of the data section, wherein the contents of the transport packet is not decoded when reproducing the recorded video data.

9. A disk device comprising video data recorded in a streaming format, and a transport packet indicating that a data section among the recorded video data is a still picture, wherein the transport packet is written at a neighboring side of the data section and the contents of the transport packet is not decoded when reproducing the recorded video data.

10. A data reproducing method for supporting still picture of data stream recorded in an optical disk, comprising the steps of:

(a) checking whether a video data reproduced from the disk is corresponding to a still picture; and

(b) conducting an iteration of transmitting a predictive picture data of the reproduced video data repeatedly after transmitting the reproduced video data based on the checked result.

11. The method set forth in claim 10, wherein the iterative transmission ratio of the video data to the predictive picture data is 1:N wherein N is greater than 1.

12. The method set forth in claim 10, wherein said step

(b) transmits header information only without sending the predictive data when transmitting the predictive picture data repeatedly.

13. The method set forth in claim 10, wherein said step  
5 (b) conducts the transmitting iteration during still time specified in still information written in the disk.

14. The method set forth in claim 10, wherein said step (b) conducts the transmitting iteration until a user requests release of still mode.

## ABSTRACT OF DISCLOSURE

The present invention relates to a data recording method for enabling a digital television to present a part of digital stream recorded in a disk such as a high-density digital versatile disk (HD-DVD) as a still picture, and a method for providing a digital television with still information based on the recorded data stream. The still picture supporting method, when reproducing a high-density disk comprising recorded video data stream; still information indicating that a video data stream section among the recorded video data stream is to be presented as a still picture; and information written in a cell on whether there is a still picture in a stream object containing the video data stream section wherein the cell is linked with the stream object, checks whether a video data reproduced from the disk is corresponding to a still picture, and conducts an iteration of transmitting a predictive picture data of the reproduced video data repeatedly after transmitting the reproduced video data based on the checked result. According to the still picture supporting method, it is possible to present a background image of menu bars for selection of various functions provided from a HD-DVD and a menu screen for editing a content scenario of a moving picture program recorded in a HD-DVD as a still picture on a digital television on condition that a HDVD player is delivering real data in the format of data stream to a digital television connected through a digital interface such as IEEE 1394.

FIG. 1

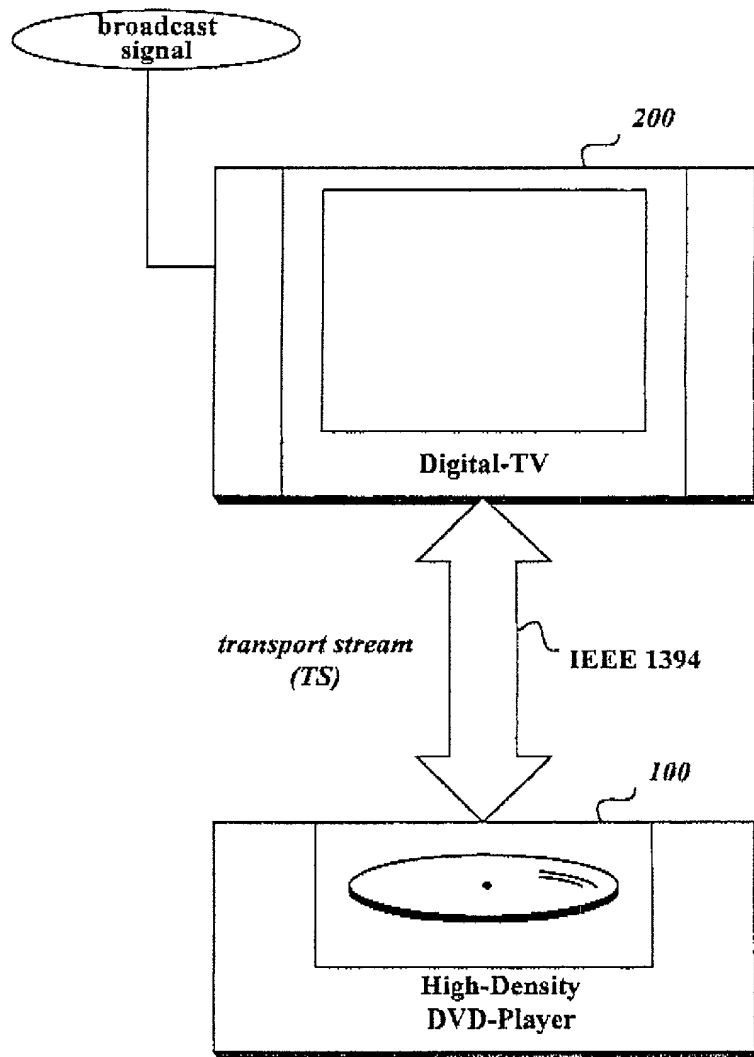
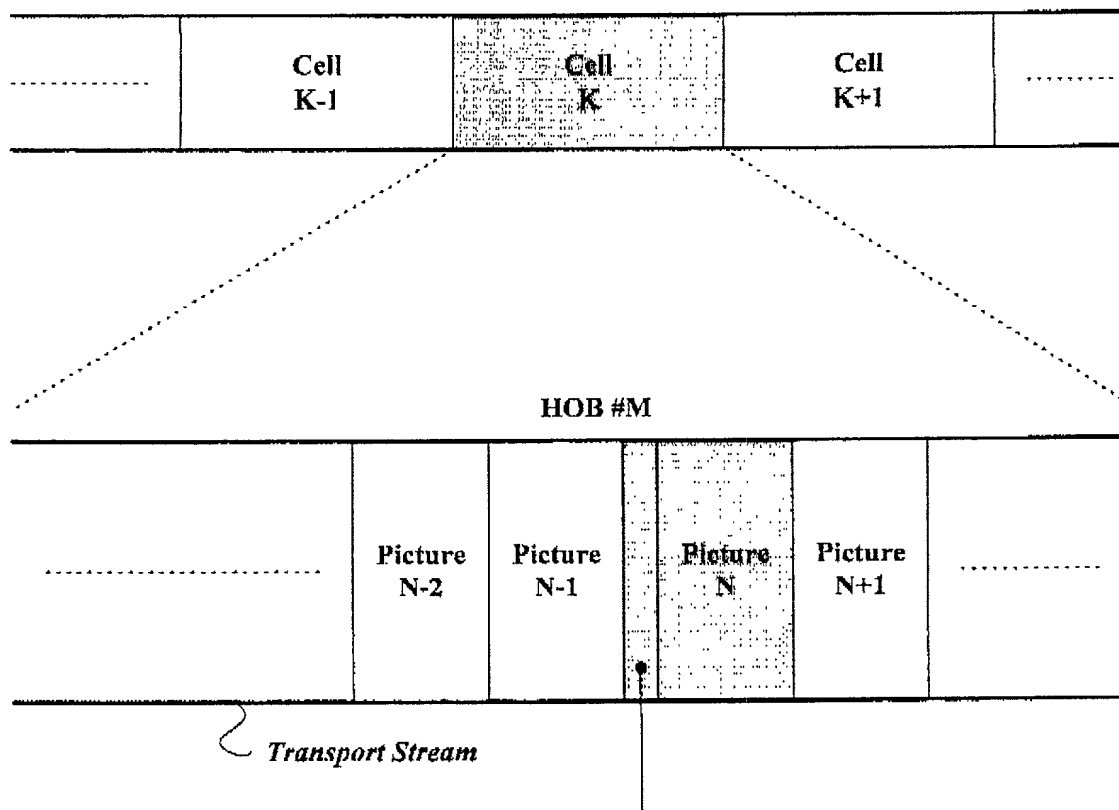




FIG. 2



*a still packet which may include duration information*

FIG. 3A

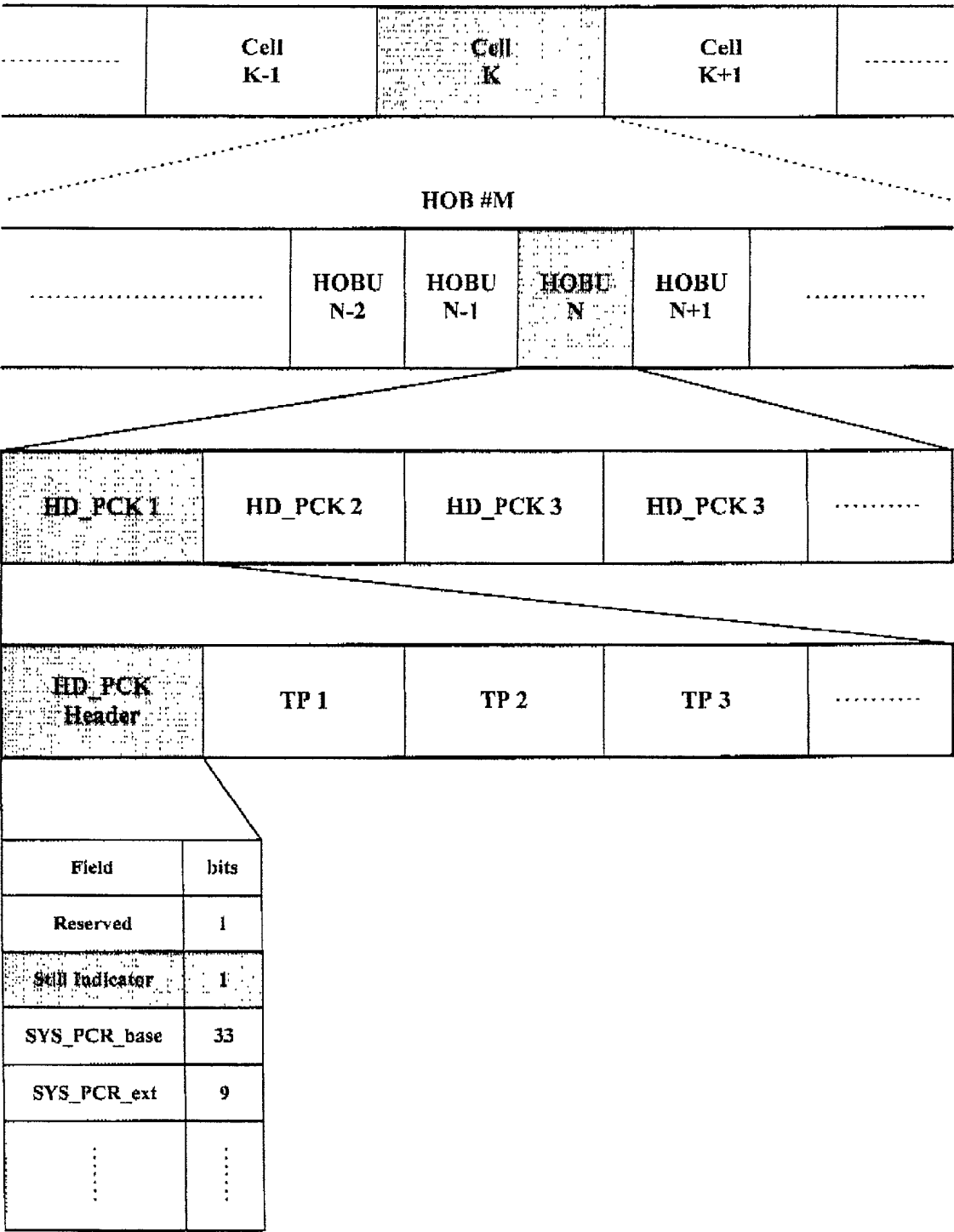


FIG. 3B

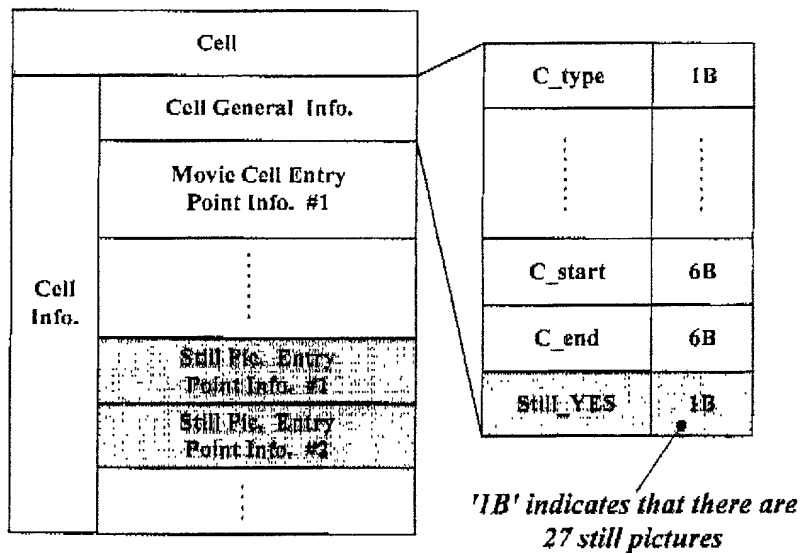
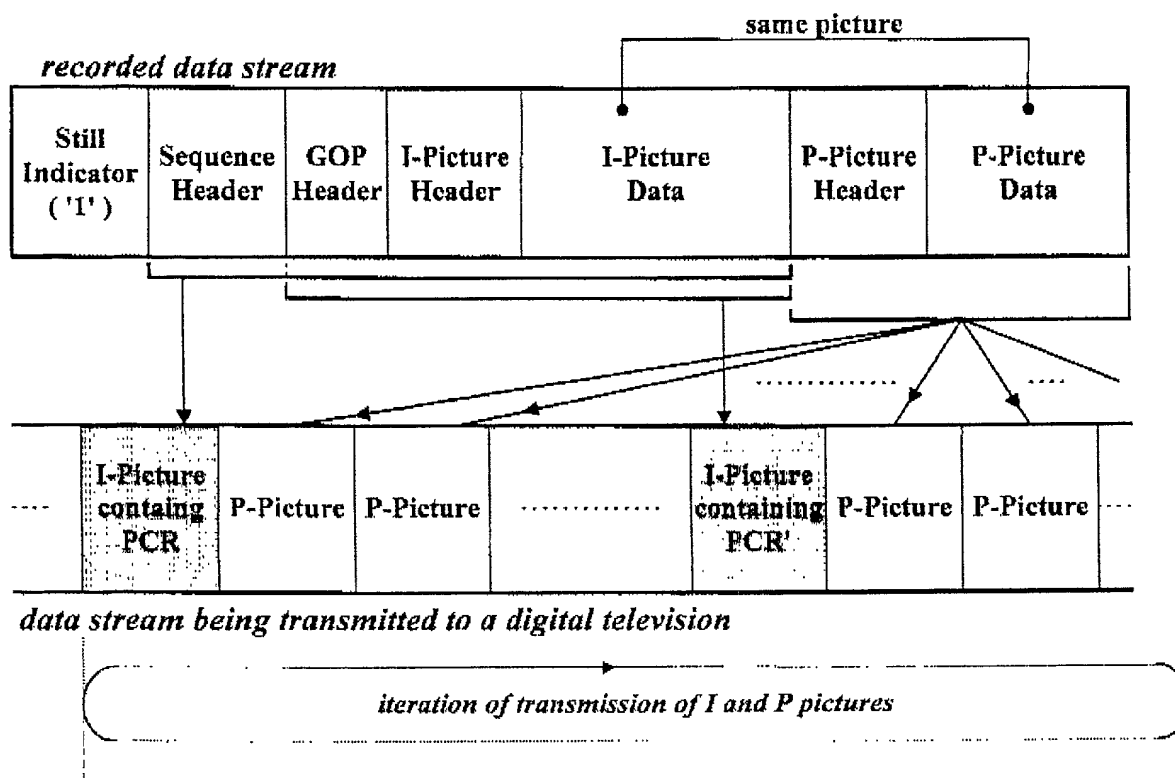


FIG. 4



Attorney Docket No.

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FOR PATENT AND DESIGN APPLICATIONS**

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Insert Title:

METHOD FOR SUPPORTING A STILL PICTURE OF DATA STREAM RECORDED  
IN A DISK RECORDING MEDIUM

Fill in Appropriate  
Information -  
For Use Without  
Specification  
Attached:

the specification of which is attached hereto. If not attached hereto,

the specification was filed on \_\_\_\_\_ as  
United States Application Number \_\_\_\_\_;  
and amended on \_\_\_\_\_ (if applicable) and/or  
the specification was filed on \_\_\_\_\_ as PCT  
International Application Number \_\_\_\_\_; and was  
amended under PCT Article 19 on \_\_\_\_\_ (if applicable)

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, §1.56.

I do not know and do not believe the same was ever known or used in the United States of America before my or our invention thereof, or patented or described in any printed publication in any country before my or our invention thereof or more than one year prior to this application, that the same was not in public use or on sale in the United States of America more than one year prior to this application, that the invention has not been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by me or my legal representative or assigns more than twelve months (six months for designs) prior to this application, and that no application for patent or inventor's certificate on this invention has been filed in any country foreign to the United States of America prior to this application by me or my legal representatives or assigns, except as follows.

I hereby claim foreign priority benefits under Title 35, United States Code, §119(e)-(d) of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

**Prior Foreign Application(s)****Priority Claimed**

Insert Priority  
Information:  
(if appropriate)

<u>99-47843</u> (Number)	<u>Korea</u> (Country)	<u>10/30/99</u> (Month/Day/Year Filed)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
_____ (Number)	_____ (Country)	_____ (Month/Day/Year Filed)	<input type="checkbox"/> Yes	<input type="checkbox"/> No
_____ (Number)	_____ (Country)	_____ (Month/Day/Year Filed)	<input type="checkbox"/> Yes	<input type="checkbox"/> No
_____ (Number)	_____ (Country)	_____ (Month/Day/Year Filed)	<input type="checkbox"/> Yes	<input type="checkbox"/> No

I hereby claim the benefit under Title 35, United States Code, §119(e) of any United States provisional application(s) listed below.

Insert Provisional  
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(if any)

_____ (Application Number)	_____ (Filing Date)
_____ (Application Number)	_____ (Filing Date)

All Foreign Applications, if any, for any Patent or Inventor's Certificate Filed More than 12 Months (6 Months for Designs) Prior to the Filing Date of This Application:

Country	Application Number	Date of Filing (Month/Day/Year)
_____	_____	_____
_____	_____	_____

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(if appropriate)

I hereby claim the benefit under Title 35, United States Code, §120 of any United States and/or PCT application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States and/or PCT application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose information which is material to the patentability as defined in Title 37, Code of Federal Regulations, §1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application.

Insert Prior U.S.  
Application(s):  
(if any)

_____ (Application Number)	_____ (Filing Date)	_____ (Status - patented, pending, abandoned)
_____ (Application Number)	_____ (Filing Date)	_____ (Status - patented, pending, abandoned)

## Attorney Docket No.

I hereby appoint the following attorneys to prosecute this application and/or an international application based on this application and to transact all business in the Patent and Trademark Office connected therewith and in connection with the resulting patent based on instructions received from the entity who first sent the application papers to the attorneys identified below, unless the inventor(s) or assignee provides said attorneys with a written notice to the contrary:

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1091 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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Residence (City, State & Country) Seoul, Korea		CITIZENSHIP Republic of Korea	
POST OFFICE ADDRESS (Complete Street Address including City, State & Country) C-306, Maebong Samsung Apt., Dogok-dong, Kangnam-gu, Seoul, 135-272, Korea			
GIVEN NAME/FAMILY NAME		INVENTOR'S SIGNATURE	DATE*
Residence (City, State & Country)		CITIZENSHIP	
POST OFFICE ADDRESS (Complete Street Address including City, State & Country)			
GIVEN NAME/FAMILY NAME		INVENTOR'S SIGNATURE	DATE*
Residence (City, State & Country)		CITIZENSHIP	
POST OFFICE ADDRESS (Complete Street Address including City, State & Country)			